REMARKS

The Office Action mailed December 15, 2004, has been carefully reviewed and the following remarks and amendment have been made in consequence thereof. A copy of a preliminary amendment submitted on August 25, 2004, and supporting documentation is attached hereto for entry into the record.

Claims 1-20 are pending in this application. Claims 1, 2, 4-9, 11-16, 19, and 20 are rejected. Claims 3, 10, 17, and 18 are objected to.

The objection to the drawings under 37 C.F.R. 1.83 (a), is respectfully traversed. Specifically, under 37 C.F.R. 1.83 (a), features disclosed in the description and claims need not be shown in the drawings where their detailed illustration is not essential for a proper understanding of the invention. More specifically, the Federal Circuit has opined in *Verve LLC v. Crane Cams, Inc.*, 65 USPQ 2d 1051, 1053-1054 (Fed. Cir. 2002), that "[p]atent documents are written for persons familiar with the relevant field; the patentee is not required to include in the specification information readily understood by practitioners, lest every patent be written as a comprehensive tutorial and treatise for the generalist, instead of a concise statement for persons in the field." In the present case, Applicant respectfully submits that an artisan of ordinary skill in the art, after reading the specification in light of the Figures, would understand how the second opening extends through the rotor blade downstream sidewall such that the second opening is between the rotor blade platform and dovetail. For example, as recited in paragraph [0021], as amended in the preliminary amendment submitted August 25, 2004

> Cooling circuit second cooling opening 134 extends at least partially through shank convex sidewall 122 such that opening 134 extends between sidewall 122 and platform downstream skirt 92. Accordingly, a discharge side (not shown) of opening 134 is between platform 62 and dovetail 66, and more specifically, is between aft angel wing 102 and dovetail 66

Accordingly, Applicant respectfully submits that the recitations of Claims 3, 10, and 16are supported by the specification, and would be understood by one of ordinary skill in the art. For the reasons set forth above, Applicant respectfully requests the objection to the drawings under 37 C.F.R. 1.83 (a) be withdrawn.

The objection to the specification is respectfully traversed. Specifically, paragraph [0023] has been amended to recite "[a]irflow discharged from opening 134 is also channeled from cooling opening 134 towards aft angel wing 102." Accordingly, for the reasons set forth above, Applicant respectfully requests the objection to the specification be withdrawn.

The rejection of Claims 1, 5, 6, 12, and 13 under 35 U.S.C. 102(b) as being anticipated by Demers et al. (U.S. Pat. No. 6,416,284) is respectfully traversed.

Demers et al. describe a turbine blade (30) including a platform (40), an airfoil (42) extending radially from a radially outer side of the platform, and a shank extending radially from an underside (108) or radially inner side of the platform than the airfoil. The shank includes a pair of circumferentially-spaced sidewalls that are coupled together by an upstream sidewall and a downstream sidewall. An internal cooling circuit (52, 54, 56) formed in the airfoil enables a cooling fluid to be circulated therein. A supply passage (110) extends through one of the circumferentially-spaced sidewalls and into flow communication with the cooling circuit. The supply passage enables cooling fluid to be delivered from the cooling circuit to facilitate cooling of the platform underside. Notably, the supply passages do not extend through the upstream or downsteam sidewalls of the shank.

Claim 1 recites a method for fabricating a rotor assembly for a gas turbine engine, wherein the method comprises "providing a plurality of rotor blades that each include an airfoil, a dovetail, a shank, and a platform...wherein the shank includes a pair of opposed sidewalls connected together by an upstream rotor blade sidewall and a downstream rotor blade sidewall...forming a cooling circuit within a portion of the shank to supply cooling air to the rotor blade for supplying cooling air to the rotor blade through a first opening for impingement cooling a portion of the rotor blade and for supplying cooling air to the rotor blade through a second opening for purging a cavity defined downstream from the rotor blade, wherein the second opening extends through one of the rotor blade downstream sidewall and the rotor blade upstream sidewall."

Demers et al. do not describe nor suggest a method for fabricating a rotor assembly for a gas turbine engine, wherein the method includes forming a cooling circuit within a portion of the shank to supply cooling air to the rotor blade for supplying cooling air to the rotor blade through a first opening for impingement cooling a portion of the rotor blade and

for supplying cooling air to the rotor blade through a second opening for purging a cavity defined downstream from the rotor blade, wherein the second opening extends through one of the rotor blade downstream sidewall and the rotor blade upstream sidewall. Specifically, Demers et al. do not describe nor suggest forming an opening to extend through either the rotor blade downstream sidewall or the rotor upstream sidewall. Rather, in contrast to the present invention, Demers et al. describe a rotor blade that includes a plurality of openings that extend through one of the circumferentially-spaced sidewalls of the shank. Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Demers et al.

Claim 5 depends from independent Claim 1. When the recitations of Claim 5 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claim 5 likewise is patentable over Demers et al.

Claim 6 recites a rotor blade for a gas turbine engine, wherein the rotor blade comprises "a platform...a shank extending radially inward from said platform, said shank comprising a pair of opposed sidewalls coupled together by an upstream sidewall and a downstream sidewall...a cooling circuit comprising a plurality of openings extending through a portion of said shank for supplying cooling air for impingement cooling at least a portion of said rotor blade and for channeling purge air downstream from said rotor blade into a cavity defined within the gas turbine engine, one of said plurality of openings extends through one of said shank upstream sidewall and said shank downstream sidewall."

Demers et al. do not describe nor suggest a rotor blade for a gas turbine engine including a cooling circuit comprising a plurality of openings extending through a portion of said shank, wherein at least one of the plurality of openings extends through either the shank upstream sidewall or the shank downstream sidewall. Rather, in contrast to the present invention, Demers et al. describe a rotor blade that includes a plurality of openings that extend through one of the circumferentially-spaced sidewalls of the shank. Accordingly, for at least the reasons set forth above, Claim 6 is submitted to be patentable over Demers et al.

Claim 12 depends from independent Claim 6. When the recitations of Claim 12 are considered in combination with the recitations of Claim 6, Applicants submit that dependent Claim 12 likewise is patentable over Demers et al.

Claim 13 recites a gas turbine engine comprising "a rotor assembly comprising a plurality of rotor blades...each of said plurality of rotor blades comprises an airfoil, a dovetail, a shank, and a platform...said shank comprises a pair of opposed sidewalls coupled together by an upstream sidewall and a downstream sidewall...at least one of said plurality of rotor blades further comprises a cooling circuit comprising a plurality of openings extending through said shank for supplying cooling air for impingement cooling a portion of said rotor blade and for supplying purge air downstream from said platform, wherein one of said plurality of openings extends through one of said shank upstream sidewall and said shank downstream sidewall."

Demers et al. do not describe nor suggest a rotor assembly including at least one rotor blade that includes a cooling circuit comprising a plurality of openings extending through a portion of said shank, wherein at least one of the plurality of openings extends through either the shank upstream sidewall or the shank downstream sidewall. Rather, in contrast to the present invention, Demers et al. describe a rotor blade that includes a plurality of openings that extend through one of the circumferentially-spaced sidewalls of the shank. Accordingly, for at least the reasons set forth above, Claim 13 is submitted to be patentable over Demers et al.

Accordingly, and for at least the reasons set forth above, Applicants respectfully request the Section 102 rejection of Claims 1, 5, 6, 12, and 13 be withdrawn.

The rejection of Claims 2, 4, 7-16, 19, and 20 under 35 U.S.C. 103 as being unpatentable over Lee (U.S. Pat. No. 6,341,939) in view of Demers et al. is respectfully traversed.

Demers et al. is described above. Lee describes a turbine blade (10) including a platform (20), an airfoil (18) extending radially from a radially outer surface (20a) of the platform, and a shank (22) extending radially from a radially inner surface (20b) of the platform. The shank includes a pair of circumferentially-spaced sidewalls that are coupled together by an upstream sidewall and a downstream sidewall. A pair of openings (36) extend through the platform and the circumferentially-spaced sidewalls of the shank and are coupled in series flow communication with an airflow channel defined inside the shank. Cooling air discharged from the openings provides impingement and film cooling of the platform.

Notably, the cooling openings do not extend through the upstream or downstream sidewalls of the shank.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Moreover, as is well established, the mere fact that the prior art structure could be modified does not make such a modification obvious unless the prior art suggests the desirability of doing so. See In re Gordon, 221 U.S.P.Q.2d 1125 (Fed. Cir. 1984). Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. In re Fritch, 23 U.S.P.Q.2d 1780 (Fed. Cir. 1992). Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.

The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Lee is cited for teaching a rotor blade including a cooling circuit that directs cooling air through an opening for impingement cooling of the platform, and Demers is merely cited for teaching a rotor blade including a cooling opening in a shank that directs air downstream towards the platform. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of

course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

Moreover, neither Lee nor Demers et al., considered alone or in combination, describe or suggest the claimed invention. Specifically, Claim 1 recites a method for fabricating a rotor assembly for a gas turbine engine, wherein the method comprises "providing a plurality of rotor blades that each include an airfoil, a dovetail, a shank, and a platform...wherein the shank includes a pair of opposed sidewalls connected together by an upstream rotor blade sidewall and a downstream rotor blade sidewall...forming a cooling circuit within a portion of the shank to supply cooling air to the rotor blade for supplying cooling air to the rotor blade through a first opening for impingement cooling a portion of the rotor blade and for supplying cooling air to the rotor blade through a second opening for purging a cavity defined downstream from the rotor blade, wherein the second opening extends through one of the rotor blade downstream sidewall and the rotor blade upstream sidewall."

No combination of Lee and Demers et al. describes or suggests a method for fabricating a rotor assembly for a gas turbine engine, wherein the method includes forming a cooling circuit within a portion of the shank to supply cooling air to the rotor blade for supplying cooling air to the rotor blade through a first opening for impingement cooling a portion of the rotor blade and for supplying cooling air to the rotor blade through a second opening for purging a cavity defined downstream from the rotor blade, wherein the second opening extends through one of the rotor blade downstream sidewall and the rotor blade upstream sidewall. Specifically, no combination of Lee and Demers et al. describes or suggests forming an opening to extend through either the rotor blade downstream sidewall or the rotor upstream sidewall. Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Lee in view of Demers et al.

Claims 2 and 4 depend from independent Claim 1. When the recitations of Claims 2 and 4 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 2 and 4 likewise are patentable over Lee in view of Demers et al.

Claim 6 recites a rotor blade for a gas turbine engine, wherein the rotor blade comprises "a platform...a shank extending radially inward from said platform, said shank comprising a pair of opposed sidewalls coupled together by an upstream sidewall and a

downstream sidewall...a cooling circuit comprising a plurality of openings extending through a portion of said shank for supplying cooling air for impingement cooling at least a portion of said rotor blade and for channeling purge air downstream from said rotor blade into a cavity defined within the gas turbine engine, one of said plurality of openings extends through one of said shank upstream sidewall and said shank downstream sidewall."

No combination of Lee and Demers et al. describes or suggests a rotor blade for a gas turbine engine including a cooling circuit comprising a plurality of openings extending through a portion of said shank, wherein at least one of the plurality of openings extends through either the shank upstream sidewall or the shank downstream sidewall. Accordingly, for at least the reasons set forth above, Claim 6 is submitted to be patentable over Lee in view of Demers et al.

Claims 7-12 depend from independent Claim 6. When the recitations of Claims 7-12 are considered in combination with the recitations of Claim 6, Applicants submit that dependent Claims 7-12 likewise are patentable over Lee in view of Demers et al.

Claim 13 recites a gas turbine engine comprising "a rotor assembly comprising a plurality of rotor blades...each of said plurality of rotor blades comprises an airfoil, a dovetail, a shank, and a platform...said shank comprises a pair of opposed sidewalls coupled together by an upstream sidewall and a downstream sidewall...at least one of said plurality of rotor blades further comprises a cooling circuit comprising a plurality of openings extending through said shank for supplying cooling air for impingement cooling a portion of said rotor blade and for supplying purge air downstream from said platform, wherein one of said plurality of openings extends through one of said shank upstream sidewall and said shank downstream sidewall."

No combination of Lee and Demers et al. describes or suggests a rotor assembly including at least one rotor blade that includes a cooling circuit comprising a plurality of openings extending through a portion of said shank, wherein at least one of the plurality of openings extends through either the shank upstream sidewall or the shank downstream sidewall. Accordingly, for at least the reasons set forth above, Claim 13 is submitted to be patentable over Lee in view of Demers et al.

Claims 14-16, 19, and 20 depend from independent Claim 13. When the recitations of Claims 14-16, 19, and 20 are considered in combination with the recitations of Claim 13, Applicants submit that dependent Claims 14-16, 19, and 20 likewise are patentable over Lee in view of Demers et al.

For the reasons set forth above, Applicants request that the Section 103 rejection of Claims 2, 4, 7-16, 19, and 20 be withdrawn.

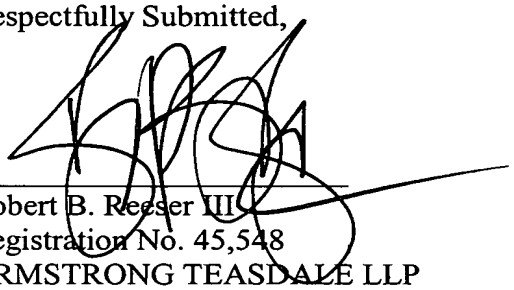
Claims 3, 10, 17, and 18 were indicated as being allowable if rewritten in independent form including the limitations of the base claim. Claim 3 depends from independent Claim 1 which is submitted to be in condition for allowance. When the recitations of Claim 3 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claim 3 likewise is in condition for allowance.

Claim 10 depends from independent Claim 6 which is submitted to be in condition for allowance. When the recitations of Claim 10 are considered in combination with the recitations of Claim 6, Applicants submit that dependent Claim 10 likewise is in condition for allowance.

Claims 17 and18 depend from independent Claim 13 which is submitted to be in condition for allowance. When the recitations of Claims 17 and 18 are considered in combination with the recitations of Claim 13, Applicants submit that dependent Claims 17 and 18 likewise are in condition for allowance.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



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Atty Dkt. No.: 133040 (12729-328)
Inventors: Ronald Eugene McRae, et al.
Serial No.: 10/653,519
Filed: September 2, 2003
For: METHODS AND APPARATUS FOR COOLING GAS TURBINE ENGINE ROTOR ASSEMBLIES

Enclosed:

- Preliminary Amendment (4 pgs.)
- Amendment Transmittal (3 pgs., *in duplicate*)
- Return post card

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Mailed: August 25, 2004
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133040
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Ronald Eugene McRae, et al.

Serial No.: 10/653,519

Filed: September 2, 2003

For: METHODS AND APPARATUS FOR COOLING GAS TURBINE ENGINE ROTOR ASSEMBLIES

Art Unit: 3745

Examiner: unassigned

PRELIMINARY AMENDMENT

Mail Stop: AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Please enter the following amendment prior to examination of this application.

IN THE SPECIFICATION

At page 5, please replace paragraph [0021] with the following amended paragraph:

[0021] Cooling circuit second cooling opening 134 extends at least partially through shank ~~convex sidewall 120~~ convex sidewall 122 such that opening 134 extends between ~~sidewall 120~~ sidewall 122 and platform downstream skirt 92. Accordingly, a discharge side (not shown) of opening 134 is between platform 62 and dovetail 66, and more specifically, is between aft angel wing 102 and dovetail 66.

At page 5, please replace paragraph [0022] with the following amended paragraph:

[0022] During engine operation, at least some cooling air supplied to blade 52 through dovetail 66 is discharged outwardly through concave opening 132. More specifically, opening 132 is oriented such that air discharged therethrough is directed towards platform 62 for impingement cooling of platform 62 along platform pressure-side edge 94. Specifically, air discharged from cooling opening 132 impinges upon an underside 150 of platform pressure-side edge 94. During engine operation, rotor blade pressure side 54 is generally exposed to higher temperatures than rotor blade suction side 56. During operation, ~~cooling opening 134~~ cooling opening 132 facilitates reducing an operating temperature of platform 62.

At page 5, please replace paragraph [0023] with the following amended paragraph:

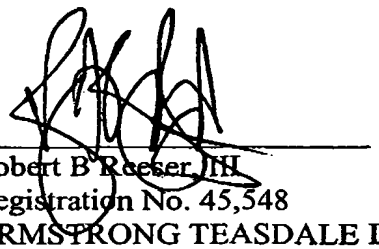
Airflow discharged from opening 134 is also channeled through cooling opening 134 towards aft angel wing 102. More specifically, air discharged from cooling opening 134 facilitates purging aft angel wing buffer cavity 110. Maintaining adequate purging of cavity 110 facilitates reducing an operating temperature and an amount of creep of aft angel wing 102. The majority of airflow through opening 134 is airflow that had been discharged from opening 132. Without cooling opening 132, opening 134 would primarily only receive secondary airflow from forward wheel space cavity 109, and as such, ~~cavity 108~~ cavity 110 would receive a reduced purge flow. Accordingly, the combination of concave shank cooling

hole 132 and convex shank cooling hole 134 provide enough cooling air to cavity 110 such that flowpath ingestion that may occur within at least some known rotor blades is facilitated to be reduced.

Remarks

Applicants request entry of the foregoing amendment prior to examination of this application. Favorable action is respectfully solicited.

Respectfully Submitted,



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